parts (table 2). Also, the pubescence of the upper leaf surface is quantitative with *C. scaposa parva* being consistently more hirsute than *C. scaposa scaposa*. On the other hand, *C. scaposa scaposa* plants have many more leaves with crenate margins than do those of *C. scaposa parva* which have mostly entire leaves. Since there is a positive correlation between the geographic distribution (fig. 1) and many morphological features, there seems to be good justification for proposing varietal rank for these closely related entities.

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NEW AND UNUSUAL FLESHY FUNGI FROM WYOMING

Alexander H. Smith and W. G. Solheim

We plan, in this series of papers on the fleshy fungi of Wyoming, to present data on new and rare fungi as they are encountered in the course of collecting throughout the State. Wyoming is an interesting state from the standpoint of fleshy fungi because of the many mountain ranges separated by semi-arid areas of great extent. Collecting these fungi, however, is often somewhat of a problem because of the varied pattern of precipitation and temperature from year to year. There are still many undescribed and many poorly known species in the Rocky Mountain area, and of course our main objective is to discover and describe these as rapidly as possible. A second important objective is to acquire data for plotting the distribution of both the rare and common species. In this respect it is interesting to note here the extension to the most easterly range of the Rockies of the ranges of a number of species described from the West Coast. Mycologists are just beginning to get sufficient data on many species to allow meaningful distributions for them to be established. Collections from Wyoming will yield valuable information on this subject. The

third main objective is to establish associations, whenever possible, between a given species of fungus and a given species of seed plant. Naturally this phase ties in with a study of distribution because in many instances it is evident that the distribution of a particular fungus directly parallels that of a species or genus of seed plants. Since such associations are based on circumstantial evidence, many observations are needed to establish a correlation. If the fungus is a mycorrhiza-former, the association is likely to be closer than if the fungus is merely a saprobe living, say, on the fallen needles and debris of conifers.

The work of exploration was begun in the summer of 1950 and was continued by the resident author during the season of 1951. It will be continued whenever opportunity favors in the future. The present report contains a few of our interesting discoveries, and represents only a fraction of the material collected. In the difficult genera such as *Cortinarius, Russula* and *Psathyrella,* it often takes several years collecting to properly establish the presence of, and to circumscribe, the taxa as they occur in an area. In this type of work it is too easy to fall into the error made by many mycologists of collecting in an area only one season and then drawing extensive conclusions from the material obtained even though much of it may be scanty and atypical.

The specimens cited are deposited in the Herbarium of the University of Michigan, the Rocky Mountain Herbarium of the University of Wyoming and in the personal herbarium of the resident author. The color names within quotation marks are taken from Ridgway (1912). For species for which no technical description is given in the text of this paper, a citation of the description used to identify the collection is given following the authority of the species. The nomenclature followed is according to The International Rules of Botanical Nomenclature.

List of Species

Armillaria luteovirens (Fr.) Sacc. (Smith 1950, p. 354). This rare fungus was first found in North America in the Columbia River Gorge near Crown Point, on the Oregon side of the river. Subsequently, during the season of 1948 Stuntz and Smith made a number of collections in Mount Rainier National Park (*Smith 29648*; *30309*; *30459*; *30511*; *30993*; *31426*; *31538*, and one unnumbered) during July, August and September. During the season of 1950 it was observed on a number of occasions in the Happy Jack section of the Pole Mountain area, Laramie Mountains, Albany County, Wyoming (*Smith 35349*; *35681*) during August, and the resident author collected it again in 1951 (*Solheim 3408*; *3409*).

In the field this fungus is not always easily distinguished

from *A. albolanaripes* Atk., especially if faded fruiting bodies of both are encountered—as may easily happen in dry areas such as that around Pole Mountain. In the laboratory the amyloid spores of *A. luteovirens* enable it to be readily distinguished. In most of the Wyoming collections the bright yellow of the typical form of *A. luteovirens* had almost disappeared, being visible only in the incurved edges of the pilei. In one collection (*Smith 35681*) the caps were pallid with avellaneous scales and the stipe white and nearly smooth. Another collection, however (*Solheim 3409*), shows the characteristic color and scales on both pileus and stipe. One of the young fruiting bodies stained pale yellow when bruised, (*Smith 35349*) a reaction we have not observed on any of the other collections listed.

Calvatia fumosa Zeller (1947, p. 309). An excellent collection of this species was made at Little Brooklyn Lake, Medicine Bow Mountains, Albany County, Wyoming, on soil under spruce and fir, August 9, 1951, by Ragnhild and W. G. Solheim (*Solheim 3389*). This extends the known range to the eastern Rocky Mountains. It was described from specimens collected near Crater Lake in Oregon and Mount Shasta in California. The smokly brown to pallid peridia remind one of a *Scleroderma*.

Clitocybe maxima (Fr.) Kummer (Smith 1944, p. 675). Good material of this species was found by Ragnhild and W. G. Solheim on wet soil under aspen and conifers, Libby Creek Bridge, above Centennial, Medicine Bow Mountains, Albany County, Wyoming, August 9, 1951 (*Solheim 3381*). The spores in this collection measure 9-12 × 5-6.5 μ as contrasted to 7-9 × 5-6 μ in Smith's Olympic Mountain collection, and many two-spored basidia are present. Aside from these two characters, the Olympic and Wyoming collections appear to be identical. This species has now been found in Michigan also, so its known distribution in North America has been considerably extended.

Gautieria graveolens Vitt. f. **inodora** f. nov. *G. graveolens* f. *graveolens* similis sed inodora. Specimen typicum legit prope Tahquamenon Falls State Park, Luce County, Michigan, July 9, 1951, *Smith 36761*.

Spores 13.5-18 × 9-11 μ, pale yellowish in KOH, rusty brown in Melzer's reagent, 5-8 longitudinal striations, outer envelope wavy to nodulose along the backs of the striations (or the bumps appearing almost bubble-like), the interior thickened wall yellowish in KOH, smooth or nearly so, spore usually short-pedicellate from remains of the sterigma, outer spore membrane usually terminating as an inconspicuous collar around apex of apiculus (where the latter broadens into the spore); basidia two-spored, 28-35 × 10-14 μ; cystidia none seen; subhymenium pseudo-parenchymatous; trama of narrow gela-

tinous (in KOH) hyaline hyphae; no clamp connections seen; peridium 1-3 cm. diam., rubbery cartilaginous fresh, *inodorous;* columella branching and gelatinous in texture; cavities opening to exterior minute, round to irregular, remains of peridium scanty and evanescent, of loosely interwoven hyphae; gleba cinnamon at maturity.

Collected at base of a tree at the viewing area at the Upper Falls, Tahquamenon Falls State Park, Luce County, Michigan, July 9, 1951, by C. W. Creaser (*Smith 36761*). In Wyoming it has been found above Nash Fork Bridge, below University of Wyoming Science Camp, Medicine Bow Mountains, Albany County, August 9, 1951, *Solheim 3396*.

Old as well as young fruiting bodies were present in the Michigan collection and no odor whatsoever was present. The spores, in addition, average smaller than as given by Zeller and Dodge (1918) and have fewer striations. These and the apparent lack of cystidia may possibly be further distinguishing characters. Povah collected a very similar form, from Isle Royal, Michigan, which C. W. Dodge identified as *G. graveolens,* but it possessed an odor. Creaser's collection appears to be the same as the Isle Royal collection microscopically, and it is on this basis that his collection is described as a variant of *G. graveolens.* The Wyoming collection appears to be the same also but is made up of young to barely mature peridia. For this reason it is not designated as the type.

Kuehneromyces vernalis (Pk.) Singer and Smith (1946, p. 514). According to our experience this is the commonest brown-spored agaric on decaying conifer wood during the spring and early summer in the northern Great Lakes Region and the Western United States. It often fruits throughout the season in Wyoming because of the high elevations. We found it frequently in the vicinity of the University of Wyoming Science Camp during 1950 (*Smith 34370; 34377* and *34384* at Sheep Mountain; *34417; 34436; 34807* from the Haskins Creek Area in the Sierra Madre Mountains, July 13; *34888* at Pole Mountain), and the resident author collected it again on several occasions in 1951 (*Solheim 3370; 3373*). The length of the fruiting season in 1950 cannot be judged from our records because we tired of collecting the fungus after the middle of July.

Mycena Overholtsii sp. nov. Pileus 2-5 cm. latus, glaber, atrofuligineus demum pallide cinereus, subhygrophanus; lamellae confertae, subdistantes, latae, pallidae dein cinereae; stipes 4-10 cm. longus, 2-6 cm. crassus, deorsum dense strigosus et "Verona brown"; sporae 6-7 $\times$ 3.5-4 μ; cheilocystidia 26-32 $\times$ 5-8 μ, fusoid-ventricosa vel cylindrica. Specimen typicum legit *Solheim, Thiers and Smith* (*Smith 34405*), University of Wyoming Science Camp, Medicine Bow Mountains, Albany

County, Wyoming, June 29, 1950.

Pileus 2-5 cm. broad, obtuse to convex, expanding to plane or nearly so, margin in some recurved in age, surface glabrous and moist to slightly lubricous, dark blackish fuligineous at first, gradually becoming pale grey to pallid, margin often translucent-striate in age, subhygrophanous; flesh watery gray, cartilaginous, taste mild; odor pungent and yeasty; lamellae close to subdistant, moderately broad, broadly adnate or in age subdecurrent, whitish to pale cinereous, both flesh and gills often staining gray when bruised, edges even; stipe 4-10 cm. long, 2-6 mm. thick, enlarged downward, pallid above, darker below and becoming reddish brown downwards ("Verona brown"), densely fibrillose-strigose over the lower two-thirds.

Spores 6-7 $\times$ 3.5-4 μ, narrowly ovate to oblong, or pip-shaped when immature, smooth, distinctly blue in Melzer's solution; basidia four-spored; pleurocystidia rare to absent, similar to cheilocystidia; cheilocystidia filamentous to fusoid-ventricose, scattered, 26-32 $\times$ 5-8 μ, smooth; gill trama somewhat interwoven to subparallel, subhymenium gelatinous in KOH, of closely interwoven narrow hyphae; pileus trama with a thin to rudimentary pellicle of appressed narrow (2-4 μ) hyphae and only subgelatinous in KOH, hypodermal region becoming somewhat differentiated or remaining scarcely differentiated from remainder of the flesh, trama proper pale orange-brown in Melzer's solution (as is the gill trama also); clamp connections present.

Habit, habitat and distribution. Densely cespitose on rotting conifer logs and stumps at high elevations in the Rocky Mountains and the Cascades, in the spring and early summer as the snow melts. The large clusters of fruiting bodies are often found on wood still partly buried in the snow. Imshaug (*Smith 29002*) found it in Mount Rainier National Park, during July, under conditions similar to those of the type collection. Additional collections from the Medicine Bow Mountains are as follows: *Smith 34320; 34327; 34328; 34329; 34358; 34360; 34399; 34402; 34420; 34466; Solheim 2810; 2836* and *Thiers 100.*

The senior author first studied this species from material sent to him by the late L. O. Overholts but erroneously referred it to *M. laevigata.* The study of abundant collections of fresh specimens showed it to be an undescribed species which we take pleasure in dedicating to Professor Overholts. *M. Overholtsii* is most closely related to *M. laevigata,* but differs in the stipe not being either lubricous or viscid, in the manner in which the gills stain, and particularly in the gray or darker color of the gills as dried. The pungent odor may be an additional character since it was fairly constant during the time

we observed fresh material. When fresh the two species actually appear quite different. The time and manner of fruiting also appear to be distinctive. Apparently the fungus is not at all uncommon during the spring and early summer in the mountains of our western states.

Mycena subceracea sp. nov. Pileus 10-20 mm. latus, convexus, fuscus, glaber; lamellae decurrentes, subdistantes, angustae, pallidae, stipes 2-3 cm. longus, 2-3 mm. crassus, pallidus, glaber; sporae 7-9.5 × 4-4.5 μ. Specimen typicum legit *Smith 35184,* July 27, 1950, North Fork, Little Laramie River, Medicine Bow Mountains, Wyoming.

Pileus 10-20 mm. broad, convex with an incurved margin, expanding to plane or the margin uplifted slightly, surface fuscous, scarcely fading, pallid cinerous in old specimens or when dried; no odor or taste, consistency cartilaginous; lamellae decurrent, subdistant, narrow, pallid to grayish; stipe 2-3 cm. long, 2-3 mm. thick, equal or nearly so, pallid, naked above, base white-fibrillose to strigose.

Spores 7-9.5 × 4-4.5 μ, oblong in face view, in side view curved slightly near apiculate end (hence with a depression), smooth, thin-walled, bluish in Melzer's solution (amyloid); basidia four-spored, 26-30 × 7-8 μ; pleurocystidia scattered, subcylindric with flexuous walls and rounded apexes, 50-90 × 8-11 μ, walls thickened somewhat at least in mid-portion, hayaline in KOH, yellowish in Melzer's solution; cheilocystidia similar to pleurocystidia but usually smaller and with thin walls; gill trama subparallel, yellowish in Melzer's solution; subhymenium very thin and not distinctive; pileus trama with a rudimentary pellicle of diverticulate hyphae or diverticulate hyphae arising from the surface of the exposed hypodermal cells, hypoderm well differentiated, several cells deep, trama proper filamentous and interwoven, the hyphae 10-18 μ broad, yellowish in iodine; clamp connections absent.

Habit, habitat and distribution. Gregarious under *Pinus contorta* in seepage area near a beaver dam, at an elevation of 8800 feet.

The hairs over the base of the stipe are made up of thick-walled hyaline hyphae. The fungus resembles *Hygrophorous recurvatus* in aspect when fully expanded, but it is totally different microscopically. In the classification of Smith (1947) it would key out in the Omphaliariae where the amyloid spores would place it near *Mycena pseudogrisea* and *Mycena turbinata.* The long narrow pleurocystidia with slightly thickened walls separate it from either.

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ANNUAL PLANTS AT HIGH ALTITUDES IN THE SIERRA NEVADA, CALIFORNIA

F. W. Went

In a previous paper (Went, 1948) some remarks were made about annual plants in the southern Sierra Nevada. It was shown that 75 per cent of them had close relatives in the desert, because 1) the alpine habitat of the southern Sierra is climatologically closely related to the desert habitat, and 2) so many alpine annuals belong to western American endemic genera. From Table 3 in the cited paper it would seem as if therophytes (annual plants) were more developed in the European alpine regions than in the Sierra Nevada. Observations made in 1951 in the Evolution Basin of the Southern Sierra Nevada (just west of Bishop) and in 1952 in the Mt. Banner-Ritter area tend to modify the latter conclusion. At an elevation of exactly 3000 m., about 300 m. below timberline, a total of 36 annual plants was observed (see Table 1). At 3300 m., still 12 annuals were observed, which are marked in the table. There is no doubt in my mind that many more annual species can be found at 3000 m. or above in other localities of the Sierra Nevada, or in other years. It is difficult to use the altitudinal distribution data from Jepson, since they are rather consistently too low. This may be partly due to the fact that many of his figures are based on the northern and central California mountains rather than the southern Sierra Nevada. It also is caused by the necessarily incomplete collection on which his conclusions are based, but perhaps the most important factor is that when the seeds of annuals are present at higher altitudes, they germinate more rarely, and thus these plants are collected only occasionally.

Table 1 gives data which were obtained through perusal of the herbarium of the University of California in Berkeley, Jepson's Manual, and trips into the Sierra Nevada in 1945-1951. In 1945 and 1946 the northeastern part of Yosemite National